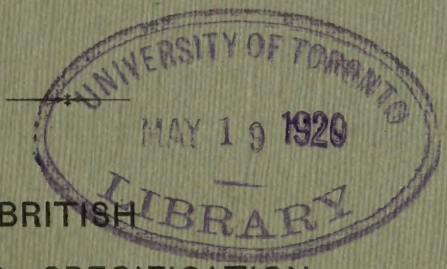
P
ech nol
B

No. 44—1909.

British Engineering Standards Association.

(Incorporated 1918).

FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE
BY
THE INSTITUTION OF CIVIL ENGINEERS.
THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.



BRITISH STANDARD SPECIFICATION FOR CAST IRON PIPES FOR HYDRAULIC POWER.

LONDON:
PUBLISHED FOR THE ASSOCIATION BY CROSBY LOCKWOOD & SON,
7, STATIONERS' HALL COURT, LUDGATE HILL, E.C. 4; AND 5, BROADWAY, WESTMINSTER, S.W. 1;
AND TO BE PURCHASED FROM ANY BOOKSELLER, OR DIRECT FROM THE OFFICES OF THE ASSOCIATION,
28, VICTORIA STREET, WESTMINSTER, S.W. 1.

June, 1918.

COPYRIGHT. ALL RIGHTS RESERVED.

Price 1/- net.

No. 44—1909.

British Engineering Standards Association.
(Incorporated 1918).

FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE
BY
THE INSTITUTION OF CIVIL ENGINEERS.
THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.

BRITISH
STANDARD SPECIFICATION
FOR
CAST IRON PIPES
FOR
HYDRAULIC POWER.

LONDON:
PUBLISHED FOR THE ASSOCIATION BY CROSBY LOCKWOOD & SON,
7, STATIONERS' HALL COURT, LUDGATE HILL, E.C. 4; AND 5, BROADWAY, WESTMINSTER, S.W. 1
AND TO BE PURCHASED FROM ANY BOOKSELLER, OR DIRECT FROM THE OFFICES OF THE ASSOCIATION
28, VICTORIA STREET, WESTMINSTER, S.W. 1.

June, 1918.

COPYRIGHT. ALL RIGHTS RESERVED.

Price 1/- net.

CONTENTS.

PAGE

List of Members of Main Committee 3
List of Members of Sectional Committee on Cast Iron Pipes 4
List of Members of Sub-Committee on Cast Iron Pipes for Hydraulic Power 4
Preface 5

SPECIFICATION: TABLE OF CLAUSES.

1. Pipes and Castings 7
2. Quality of Material 7
3. Mode of Casting 7
4. Freedom from Defects 7
5. Variation of Weight 8
6. Machining 8
7. Marking 8
8. Supply of Test Pieces 8
9. Deflection Bar 8
10. Hydraulic Test before Coating 8
11. Coating 9
12. Weighing 9
13. Inspection 9
14. Testing Facilities... 9

TABLES OF DIMENSIONS AND WEIGHTS.

TABLE 1. Straight Pipes. Classes **A** and **B**. 13
TABLE 2. Short Lengths. Classes **A** and **B**. 14
TABLE 3. Long Tees. Class **A**. 15
TABLE 4. Short Tees. Class **A**. 16
TABLE 5. Long Tees. Class **B**. 17
TABLE 6. Short Tees. Class **B**. 18
TABLE 7. 45° and 90° Bends. Classes **A** and **B**. 19
TABLE 8. Blank Flanges. Classes **A** and **B**. 20

BRITISH ENGINEERING STANDARDS ASSOCIATION.

MAIN COMMITTEE.

* SIR ARCHIBALD DENNY, BART. (*Chairman*).

SIR MAURICE FITZMAURICE, C.M.G. (*Vice-Chairman*).

SIR WILLIAM MATTHEWS, K.C.M.G. SIR DOUGLAS FOX ... ... MR. R. ELLIOTT-COOPER ... ... MR. ALEXANDER ROSS ... ... DR. W. C. UNWIN	Nominated by the Institution of Civil Engineers.
MR. H. A. IVATT ... ... MR. MICHAEL LONGRIDGE ... ... DR. WILLIAM H. MAW	Nominated by the Institution of Mechanical Engineers.
MR. G. AINSWORTH ... ... DR. ARTHUR COOPER ... ... MR. ILLTYD WILLIAMS	Nominated by the Iron and Steel Institute.
SIR THOMAS BELL, K.B.E. ... ... SIR WILLIAM SMITH, C.B.	Nominated by the Institution of Naval Architects.
COL. R. E. CROMPTON, C.B. ... ... SIR JOHN SNELL ... ... MR. C. P. SPARKS	Nominated by the Institution of Electrical Engineers.
MR. F. R. DAVENPORT ... ... MR. F. W. GILBERTSON	Co-opted by the nominated Members to represent the Federation of British Industries.
HON. SIR CHARLES PARSONS, K.C.B. ... SIR ROBERT HADFIELD, BART. ... ... SIR RICHARD GLAZEBROOK, C.B. ...	Co-opted by the nominated Members.

DR. J. H. T. TUDSBERY (*Hon. Secretary*).

MR. C. LE MAISTRE (*Secretary*).

MR. CHARLES DRESSER (*Assistant Secretary*).

* Succeeded the late SIR JOHN WOLFE BARRY, K.C.B., February, 1918.

BRITISH ENGINEERING STANDARDS ASSOCIATION.

The following are lists of Members of the Sectional Committee on Cast Iron Pipes, and of the Sub-Committee on Cast Iron Pipes for Hydraulic Power which was entrusted with the drafting of the Standard Specification and Sections of Cast Iron Pipes for Hydraulic Power.

SECTIONAL COMMITTEE ON CAST IRON PIPES.

July, 1909.

Chairman, ‡MR. CHARLES HAWKSLEY.

India Office, Mr. W. E. Phelps.

Crown Agents for the Colonies, ‡Mr. Osbert Chadwick, C.M.G.

General Post Office, Mr. Martin Roberts.

Institution of Gas Engineers, Mr. C. S. Carpenter ; Mr. Charles Hunt.

Institution of County and Municipal Engineers, Mr. F. Griffiths ; Mr. W. Watts.

British Association of Waterworks Engineers, Mr. F. Bancroft ; Mr. W. Matthews ; Mr. P. H. Palmer.

Institution of Heating and Ventilating Engineers, Mr. Louis F. Pearson.

Cast Iron Pipe Founders' Association of Great Britain, Mr. C. H. Bowser ; Mr. F. Chambers ; Mr. Cecil A. Cochrane ; Mr. F. Gandy.

‡Mr. William B. Bryan ; Mr. Colin Docwra ; ‡Mr. E. B. Ellington ; Mr. W. E. Gray ; Mr. George H. Hill ; Mr. Ernest Mansergh ; ‡Mr. Henry Rofe ; Mr. G. Watson.

‡ Since deceased.

SUB-COMMITTEE ON CAST IRON PIPES FOR HYDRAULIC POWER.

July, 1909.

Chairman, ‡Mr. E. B. ELLINGTON.

Mr. C. H. Bowser (*D. Y. Stewart & Co., Ltd.*) ; *Mr. S. G. Homfray (*Sir W. G. Armstrong, Whitworth & Co., Ltd.*) ; Mr. T. M. Newell (*North-Eastern Railway, Hull*) ; ‡Mr. T. Hurry Riches (*Taff Vale Railway*) ; †Mr. C. O. Ridley (*Sir W. G. Armstrong, Whitworth & Co., Ltd.*).

* Deceased October, 1908.

† Succeeded Mr. S. G. Homfray, February, 1909.

‡ Since deceased.

PREFACE.

The Sectional Committee on Cast Iron Pipes, under the Chairmanship of Mr. Charles Hawksley, was appointed by the Main Committee on October 23rd, 1903, and at their first meeting, held on March 29th, 1904, the following Sub-Committees were formed :—

Name.	*Chairman.*
Cast Iron Pipes, for Water, Gas, Electrical and Sewerage.	Mr. H. Rofe.
Cast Iron Pipes for Hydraulic Power.	Mr. E. B. Ellington.
Cast Iron Pipes for Heating, Ventilating and House Drainage.	Mr. Louis F. Pearson.

The Sub-Committee on Cast Iron Pipes for Hydraulic Power met for the first time on June 15th, 1904, to determine the course of procedure to be followed. As a result of this meeting information as to current practice was sought from the principal Users and Manufacturers of these pipes and a mass of valuable information was placed at the disposal of the Sub-Committee. It was found that Cast Iron Pipes for Hydraulic Power as generally used fell naturally into two divisions, the greater number being for pressures from 700 to 900 lbs. per sq. in., while in recent years higher pressures from 900 to 1,200 lbs. per sq. in., were being extensively used. It was accordingly decided to draw up two Standard series to suit these respective ranges of pressure. The Sub-Committee regard 900 lbs. per sq. in. as the maximum permissible pressure for Class **A**, and recommend that Class **B** be used when a working pressure of 900 lbs. per sq. in. and upwards is the normal working pressure.

As regards the leading dimensions, the Sub-Committee have endeavoured, as far as possible, to fall in with the general practice in existing work as indicated by the replies received. In every case except the one referred to below, it has been practicable to adopt dimensions which will allow pipes made to the Standard Specification to be connected to existing pipes without alteration. The only exception is in the case of the diameter of the Spigot of the 6-inch pipe, Class **A**. Two dimensions, $6\frac{7}{8}$ inches and 7 inches, appeared from the replies to be in general use, but it was eventually decided to make the diameter of the Spigot of the 6-inch pipe 7 inches with a note to the Table calling the attention of Users to the fact that it might be reduced to $6\frac{7}{8}$ inches if occasion required.

The existing practice with regard to the overall length of the Standard Tees is very variable and shows a general desire to keep down the weight of the Tees by limiting their length, but the Sub-Committee are of opinion that there should be sufficient room

between the back of the flange on one side of the body of the Tee and the branch to enable the bolts to be inserted from one end. The lengths given in the Tables are the least that will allow of this condition being fulfilled, but the Sub–Committee desire to point out that the lengths may be easily varied as local circumstances may require, whilst still adhering to the Standard in all other dimensions. It should be noted, however, that the Standard Bends for 90° have been so proportioned in the larger sizes as to be interchangeable with the shorter sides of the Standard equal Tees of the same bore, and any alteration to the short lengths of the Tees and to the Branches destroys such interchangeability. In the Table of Short Lengths of Straight Pipes a length has been inserted for each size of Pipe which, with a Standard Tee, will make up an ordinary straight length.

The Sub–Committee is of opinion that for pipes larger than 8 inches bore, Class **A,** and 7 inches bore, Class **B,** as also for pipes below 2 inches bore, cast iron is an unsuitable material.

The Standard Specification has been drawn so that while rigidly laying down the requirements of the Engineer, discretion is left to the Manufacturer as to the best method of obtaining the desired results.

This Report was adopted by the Sectional Committee on Cast Iron Pipes in June, 1909.

This Report was approved by the Main Committee in July, 1909.

NOTE.—*The Association desires to call attention to the fact that this Specification is intended to include technical provisions necessary for the supply of the material herein referred to, but does not purport to include all the necessary provisions of a Contract.*

BRITISH STANDARD SPECIFICATION FOR CAST IRON PIPES FOR HYDRAULIC POWER.

Pipes and Castings.

1. The Straight Pipes, Bends, Tees, and Special Castings shall be manufactured in two classes, viz. :—Class **A** for working pressures from 700 to 900 lbs. per square inch, and Class **B** for working pressures from 900 to 1,200 lbs. per square inch, and they shall conform in every respect to this Specification, and to the Schedules and Drawings hereunto annexed.

Quality of Material.

2. Cast iron for Straight Pipes, Bends, Tees, and Special Castings shall not be from first runnings, but shall all be re-melted in the cupola or air-furnace. It shall be made from a mixture of strong grey cast iron, the composition of which shall be left to the discretion of the Manufacturer. The metal shall be sufficiently tough to allow of the Straight Pipes, Bends, Tees, and Special Castings being readily drilled and tapped with a clean and strong thread.

Mode of Casting.

3. The whole of the Straight Pipes, and the Bends, Tees, and Special Castings when practicable, shall be cast vertically, in dry sand moulds and in accurately faced and truly jointed boxes, and without the use of core nails, chaplets, or thickness pieces, or any substitute therefor. They shall in all cases have a sufficient head of metal to ensure soundness, which head shall be afterwards cut off in a lathe.

Freedom from Defects.

4. The Straight Pipes, Bends, Tees, and Special Castings shall be true and cylindrical, their inner and outer surfaces being smooth and as nearly as may be concentric. They shall be in all respects sound and good castings, free from laps or other imperfections, and shall be neatly dressed and carefully fettled.

Variation of Weight.

5. A variation in weight of $2\frac{1}{2}$ per cent. above or below the Standard weights given in the Schedules, making a total range of 5 per cent., shall be allowed in the case of Straight Pipes (Tables 1 and 2), but for Bends, Tees, and other Special Castings an additional 1 per cent. above or below shall be permitted. Any Straight Pipe, Bend, Tee and Special Casting within the range of variation permitted shall be paid for according to its actual weight.

Machining.

6. The Straight Pipes, Bends, Tees, and Special Castings shall have their faces, spigots and faucets, truly machined to templates. They shall be truly machined to length, and shall be interchangeable in all dimensions.

Marking.

7. Every Straight Pipe, Bend, Tee, and Special Casting shall have cast upon it a capital letter projecting $\frac{1}{8}$ inch, corresponding to the Class letter **A** or **B** shown in the Schedules hereunto annexed, and indicating that it purports to be manufactured in accordance with the British Standard Specification. In addition to the Class letter each Straight Pipe, Bend, Tee, and Special Casting shall also bear the initials or Trade Mark of the Manufacturer and the year of manufacture, *e.g.*, |A| X. & Co., 09.

Supply of Test Pieces.

8. The Manufacturer shall from time to time, at the request of the Engineer (or of the Purchaser) or his representative, prepare from each running two test pieces of the metal actually used in casting the Straight Pipes, Bends, Tees, and Special Castings and of the dimensions given in Clause 9.

Deflection Test.

9. A bar, 1 inch wide and 2 inches deep and 3 feet 6 inches in length, when supported on edge on bearings 3 feet apart, shall sustain a load of 30 cwts. applied at the centre with a deflection of not less than three-eighths of an inch. The bar shall be tested to destruction.

Hydraulic Test before Coating.

10. Before being coated the Straight Pipes, Bends, Tees and Special Castings shall be tested under cover at the Manufacturer's Works in the presence, and to the satisfaction, of the Engineer or his representative, and they must withstand a hydraulic pressure of 2,500 lbs. per square inch for Class **A** and 3,300 lbs. per square inch for Class **B** without showing any leakage, sweating or defect of any kind. Blank flanges shall be bolted to each flange on the castings, and through bolts shall not be used. The pressure shall be applied and maintained, for the space of from two to ten minutes, by means of an Accumulator or Intensifier. While under this pressure each Straight Pipe, Bend, Tee, and Special Casting shall be

smartly struck all over with a hand hammer weighing 2½ pounds. The Straight Pipes, Bends, Tees, and Special Castings, shall, before coating, be stamped by the Engineer or his representative on the edge of the flanges with his private mark.

Coating.

11. Every Straight Pipe, Bend, Tee, and Special Casting after having been tested, and before it shall have become affected by rust, shall be heated to a suitable temperature and dipped in a bath of an approved composition according to Dr. Angus Smith's process. When the Straight Pipes, Bends, Tees, and Special Castings are removed from the bath they shall be properly drained, and the coating shall fume freely and set hard within an hour.

Weighing.

12. After coating, each Straight Pipe, Bend, Tee, and Special Casting shall be weighed.

Inspection.

13. The Engineer or his representative shall have free access to the Works of the Manufacturer at all reasonable times for the purpose of ascertaining that the conditions of this Specification are being complied with; he shall be at liberty to inspect the material and manufacture at any stage, and to reject any material, finished Straight Pipe, Bend, Tee, or Special Casting that does not conform to the terms of this Specification. Should the Engineer or his representative object to the mode in which the work is being carried on as being contrary to this Specification, or improper in any way, the Manufacturer shall be bound to pay immediate attention to the said objection.

Testing Facilities.

14. The Manufacturer shall, at his own cost, furnish and prepare the necessary test pieces of the metal actually used in casting the Straight Pipes, Bends, Tees, and Special Castings, and supply labour and appliances for such testing as may be carried out on his premises in accordance with this Specification. Failing facilities at his own works for making the prescribed tests, the Manufacturer shall bear the cost of carrying out the tests elsewhere.

BRITISH STANDARD

HYDRAULIC POWER PIPES

AND

CASTINGS.

TABLES OF DIMENSIONS AND WEIGHTS.

Table 1. Straight Pipes. Classes A and B.

Table 2. Short Lengths. Classes A and B.

Table 3. Long Tees. Class A.

Table 4. Short Tees. Class A.

Table 5. Long Tees. Class B.

Table 6. Short Tees. Class B.

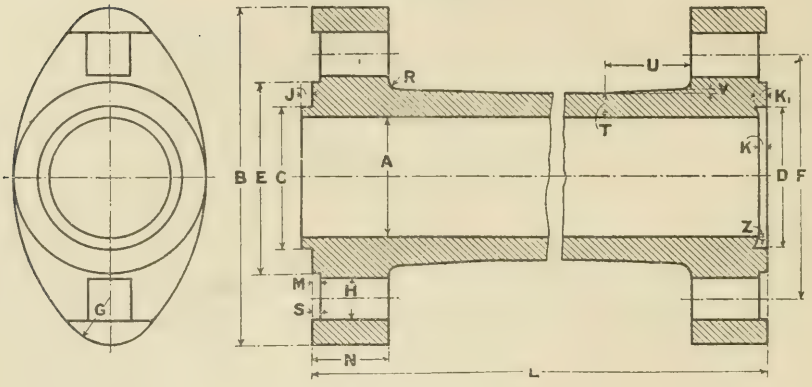
Table 7. 45° and 90° Bends. Classes A and B.

Table 8. Blank Flanges. Classes A and B.

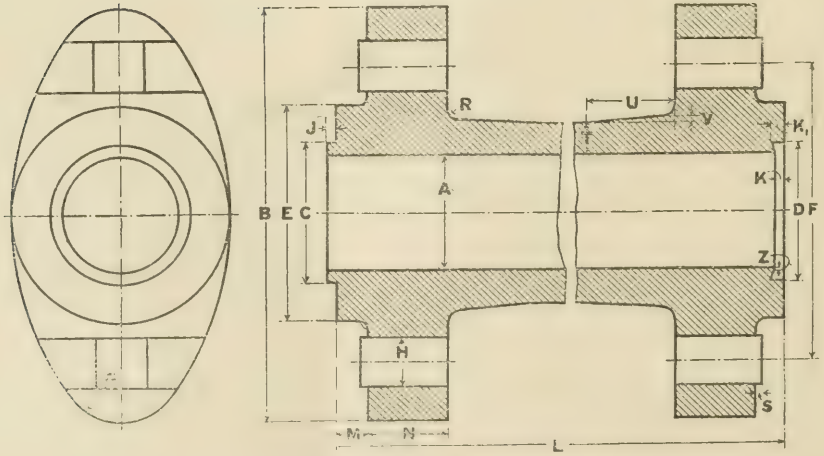
BRITISH STANDARD HYDRAULIC POWER PIPES.

KEY PLANS.

FLANGE: TYPE 1.



FLANGE: TYPE 2.



BRITISH STANDARD HYDRAULIC POWER PIPES.

	CLASS A. For Working Pressures from 700 to 900 lbs. per sq. inch.							CLASS B. For Working Pressures from 900 to 1,200 lbs. per sq. inch.					
	Flange: Type 1.			Flange: Type 2.				Flange: Type 1.		Flange: Type 2.			
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
A	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**2**	**3**	**4**	**5**	**6**	**7**
B	7⅛	9½	11½	14¼	16	20	22	8¾	11¼	14	16½	19	21
C	2¾	3¾	4¾	5¾	7*	8	9	2¾	3¾	4⅞	6	7	8
D	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.	=C + Clearance.
E	3⅜	5¼	6½	7⅝	9	12	14	4¼	6	7½	9	10½	13
F	5⅜	6¾	8¼	10¼	11½	14½	16	6	8	10¼	12¼	14	15½
G	1 1/16	1⅜	1⅝	2	2¼	2¾	3	1⅜	1⅝	1⅞	2⅛	2½	2¾
H	1⅛	1¼	1½	1⅝	1¾	2¼	2½	1¼	1½	1¾	2	2¼	2½
J K	¼	¼	⅜	⅜	⅜	⅜	⅜	¼	¼	⅜	⅜	⅜	⅜
K1	⅜	⅜	½	½	½	½	½	⅜	⅜	½	½	½	½
M	¼	¼	¼	1¼	1¼	1½	1½	¼	¼	1	1¼	1½	1¾
N	1¾	2¼	2½	2¾	3	3½	3¾	2¼	2¾	3	3¼	3½	3¾
R	⅜	⅜	⅜	½	½	⅝	¾	⅜	⅜	⅜	½	½	⅝
S	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼
T	9/16	⅝	13/16	1	1⅛	1¼	1½	⅝	⅞	1 1/16	1¼	1½	1⅝
U	—	—	—	—	—	—	—	3	3	3	3	3	3
V	—	—	—	—	—	—	—	⅛	⅛	⅛	⅛	⅛	⅛
Z	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛
Diam. of Bolt.	⅞	1	1¼	1⅜	1½	2	2¼	1	1¼	1½	1¾	2	2¼
Length of Bolt Overall.	5⅜	6⅝	7⅝	10⅞	11⅝	14	15	6⅝	8⅛	11⅛	12⅝	14	15½
LENGTH AND WEIGHT.													
Length in Feet. **L**	6	9	9	9	9	9	9	6	9	9	9	9	9
Weight in lbs.	101	232	392	608	812	1150	1571	124	352	566	826	1176	1522

All Spigots and Sockets to be made to Gauge.
All Nuts, Bolts and Screw Threads to be British Standard Whitworth.

* This dimension in many existing plants is 6⅞ ins., and if required for the purpose of making connections 6⅞ ins. may be specified, the Standard being adhered to in all other respects.

BRITISH STANDARD HYDRAULIC POWER PIPES.

WEIGHTS OF SHORT LENGTHS OF STRAIGHT PIPES.

CLASS A.

Length of Pipe.		Internal Diameter of Pipe.						
		2 ins.	**3** ins.	**4** ins.	**5** ins.	**6** ins.	**7** ins.	**8** ins.
ft.	ins.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
*7	0	—	185	—	—	—	—	—
*6	9	—	—	302	—	—	—	—
*6	2	—	—	—	437	—	—	—
6	0	—	161	272	426	570	839	1142
*5	11	—	—	—	—	562	—	—
5	6	93	149	252	396	530	787	1071
*5	5	—	—	—	—	—	779	—
*5	1	—	—	—	—	—	—	1010
5	0	86	138	232	365	489	735	999
4	6	78	126	212	334	448	682	927
*4	3	75	—	—	—	—	—	—
4	0	71	115	192	304	408	630	856
3	6	63	103	172	273	367	578	784
3	0	56	91	152	243	327	526	713
2	6	49	79	132	212	286	474	641
2	0	41	67	112	182	246	422	570
1	6	34	55	92	151	205	370	498
1	0	26	44	72	—	—	—	—

CLASS B.

Length of Pipe.		Internal Diameter of Pipe.					
		2 ins.	**3** ins.	**4** ins.	**5** ins.	**6** ins.	**7** ins.
ft.	ins.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
*6	9	—	274	—	—	—	—
*6	2	—	—	411	—	—	—
6	0	—	249	402	589	837	1100
*5	10	—	—	—	576	—	—
5	6	115	231	375	549	780	1030
5	0	107	214	348	510	724	960
4	6	98	196	321	470	667	889
*4	1	91	—	—	—	—	—
4	0	89	179	294	431	611	819
3	6	81	162	266	392	554	749
3	0	72	144	239	352	497	678
2	6	64	127	212	313	441	608
2	0	55	110	185	273	385	538
1	6	47	92	158	234	328	—
1	0	38	75	—	—	—	—

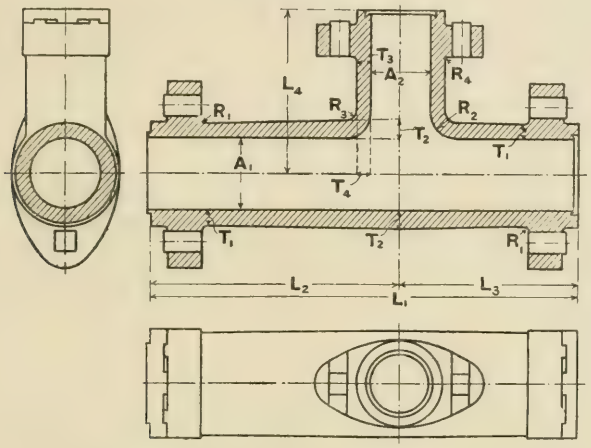
* **These lengths are required in order to make up, with addition of Tee, the ordinary Standard length of Pipe (L. Table 1).**

BRITISH STANDARD HYDRAULIC POWER TEES.

CLASS A.

FOR WORKING PRESSURES FROM 700 TO 900 LBS. PER SQUARE INCH.

LONG TEE.



	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
A_1	**5**	**6**	**6**	**7**	**7**	**7**	**8**	**8**	**8**	**8**
A_2	**5**	**5**	**6**	**5**	**6**	**7**	**5**	**6**	**7**	**8**
L_1	34	37	37	43	43	43	47	47	47	47
L_2	21	22	22	25	25	25	27	27	27	27
L_3	13	15	15	18	18	18	20	20	20	20
L_4	13	14	15	16	16	18	17	17	18	20
R_1	½	½	½	⅝	⅝	⅝	¾	¾	¾	¾
R_2	2⅜	2⅜	2½	2⅝	2¾	2⅞	3⅛	3¼	3⅜	3½
R_3	1¼	1¼	1¼	1¼	1¼	1⅜	1¼	1⅜	1½	1⅝
R_4	½	½	½	½	½	⅝	½	½	⅝	¾
T_1	1⅛	1¼	1¼	1⅜	1⅜	1⅜	1⅝	1⅝	1⅝	1⅝
T_2	1¼	1½	1½	1⅝	1⅝	1⅞	2⅛	2⅛	2⅛	2⅛
T_3	1⅛	1⅛	1¼	1⅛	1¼	1⅜	1⅛	1¼	1⅜	1⅝
T_4	1¼	1¼	1½	1½	1½	1⅞	1¾	1¾	1⅞	2⅛
Weight in lbs.	336	456	493	769	793	902	1058	1085	1184	1285

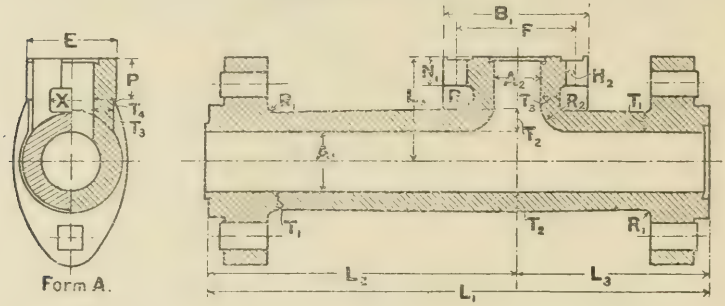
Flanges of Body and Branch to be the same as for Pipes of corresponding bore (see Table 1).

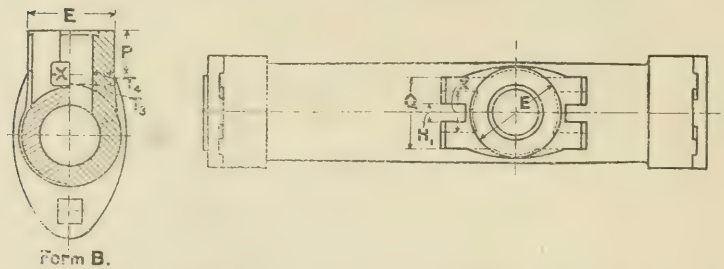
BRITISH STANDARD HYDRAULIC POWER TEES.

CLASS A.

FOR WORKING PRESSURES FROM 700 TO 900 LBS. PER SQUARE INCH.

SHORT TEE.





	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
A_1	2	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8
A_2	2	2	3	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
B_1	7½	7½	9	7½	9	10½	7½	9	10½	7½	9	10½	7½	9	10½	7½	9	10½
E	3⅞	3⅞	5¼	3⅞	5¼	6½	3⅞	5¼	6½	3⅞	5¼	6½	3⅞	5¼	6½	3⅞	5¼	6½
F	5⅜	5⅜	6¾	5⅜	6¾	8¼	5⅜	6¾	8¼	5⅜	6¾	8¼	5⅜	6¾	8¼	5⅜	6¾	8¼
H_1	1	1	1⅛	1	1⅛	1⅜	1	1⅛	1⅜	1	1⅛	1⅜	1	1⅛	1⅜	1	1⅛	1⅜
H_2	½	½	9/16	½	9/16	11/16	½	9/16	11/16	½	9/16	11/16	½	9/16	11/16	½	9/16	11/16
L_1	21	24	24	27	27	27	34	34	34	37	37	37	43	43	43	47	47	47
L_2	12	14	14	16	16	16	21	21	21	22	22	22	25	25	25	27	27	27
L_3	9	10	10	11	11	11	13	13	13	15	15	15	18	18	18	20	20	20
L_4	4⅛	4⅜	5¼	5⅜	6	6⅜	6	6½	7	6¾	7¼	7⅜	7½	8	8½	8½	9	9½
N_1	1⅛	1⅛	1½	1⅛	1½	1⅞	1⅛	1½	1⅞	1⅛	1½	1⅞	1⅛	1½	1⅞	1⅛	1½	1⅞
P	1⅝	1⅝	2⅛	1⅝	2⅛	2½	1⅝	2⅛	2½	1⅝	2⅛	2½	1⅝	2⅛	2½	1⅝	2⅛	2½
Q	3¼	3¼	4¼	3¼	4¼	4¾	3¼	4¼	4¾	3¼	4¼	4¾	3¼	4¼	4¾	3¼	4¼	4¾
R_1	⅜	⅜	⅜	⅜	⅜	⅜	½	½	½	½	½	½	⅝	⅝	⅝	¾	¾	¾
R_2	1⅜	1¼	1¼	1⅜	1½	1½	1⅜	1½	1⅝	1¾	1⅞	1⅞	2	2⅛	2¼	2¼	2⅜	2½
R_3	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜
T_1	⅝	11/16	11/16	15/16	15/16	15/16	1⅛	1⅛	1⅛	1¼	1¼	1¼	1⅜	1⅜	1⅜	1⅝	1⅝	1⅝
T_2	13/16	⅞	⅞	1 1/16	1 1/16	1 1/16	1¼	1¼	1¼	1½	1½	1½	1⅞	1⅞	1⅞	2⅛	2⅛	2⅛
T_3	13/16	⅞	⅞	1	1 1/16	1 1/16	1	1⅛	1¼	1	1⅛	1¼	1	1⅛	1¼	1	1⅛	1¼
T_4	13/16	⅞	⅞	15/16	1 1/16	1 1/16	15/16	1⅛	1¼	15/16	1⅛	1¼	15/16	1⅛	1¼	15/16	1⅛	1¼
X	1⅞	1⅞	2¼	1⅞	2¼	2¾	1⅞	2¼	2¾	1⅞	2¼	2¾	1⅞	2¼	2¾	1⅞	2¼	2¾
Weight in lbs.	51	87	95	148	158	170	266	276	288	387	397	408	687	696	707	973	982	993

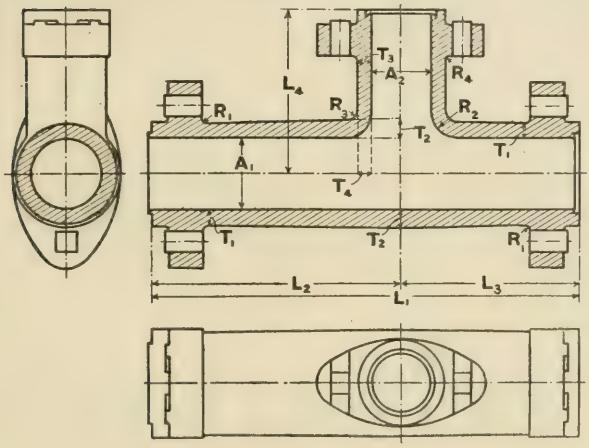
Flanges of Body of Tee to be the same as for Straight Pipes of corresponding bore (see Table 1).

BRITISH STANDARD HYDRAULIC POWER TEES.

CLASS B.

FOR WORKING PRESSURES FROM 900 TO 1,200 LBS. PER SQUARE INCH.

LONG TEE.



	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
A_1	**4**	**5**	**5**	**6**	**6**	**6**	**7**	**7**	**7**	**7**
A_2	**4**	**4**	**5**	**4**	**5**	**6**	**4**	**5**	**6**	**7**
L_1	34	38	38	42	42	42	48	48	48	48
L_2	21	22½	22½	25	25	25	28½	28½	28½	28½
L_3	13	15½	15½	17	17	17	19½	19½	19½	19½
L_4	13	14	15½	15	16	17	16	16¾	17½	19½
R_1	⅜	½	½	½	½	½	⅝	⅝	⅝	⅝
R_2	1½	1⅝	2⅜	1⅞	2⅜	2½	2¼	2⅜	2¾	2⅞
R_3	1⅛	1⅛	1¼	1⅛	1¼	1¼	1⅛	1¼	1¼	1⅜
R_4	⅜	⅜	½	⅜	½	½	⅜	½	½	⅝
T_1	1¼	1⅜	1⅜	1⅝	1⅝	1⅝	1⅜	1¾	1¾	1⅜
T_2	1⅜	1⅝	1⅝	2	2	2	2¼	2¼	2¼	2¼
T_3	1¼	1¼	1⅜	1¼	1⅜	1⅝	1¼	1⅜	1⅝	1⅜
T_4	1⅜	1½	1⅝	1½	1⅝	2	1½	1⅞	2	2¼
Weight in lbs.	346	495	546	706	755	823	1020	1065	1125	1235

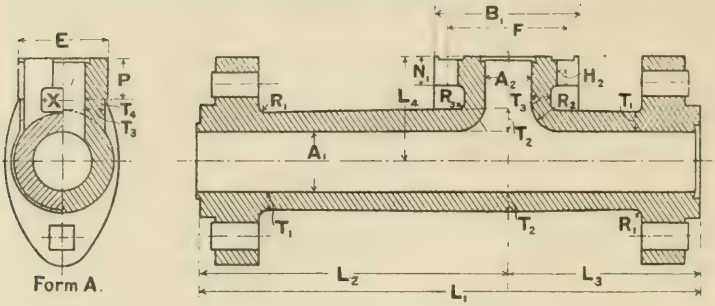
Flanges of Body and Branch to be the same as for Pipes of corresponding bore (see Table 1).

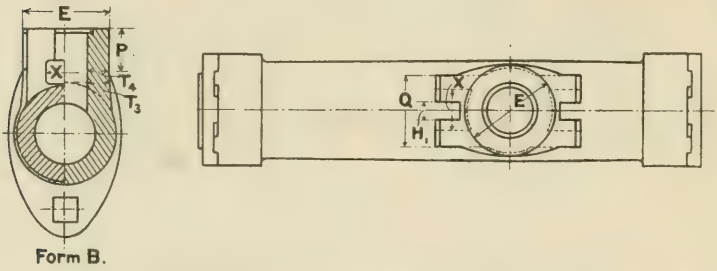
BRITISH STANDARD HYDRAULIC POWER TEES.

CLASS B.

FOR WORKING PRESSURES FROM 900 TO 1,200 LBS. PER SQUARE INCH.

SHORT TEE.

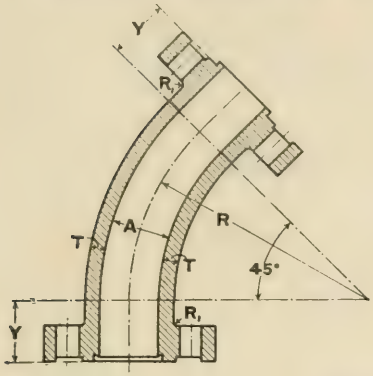


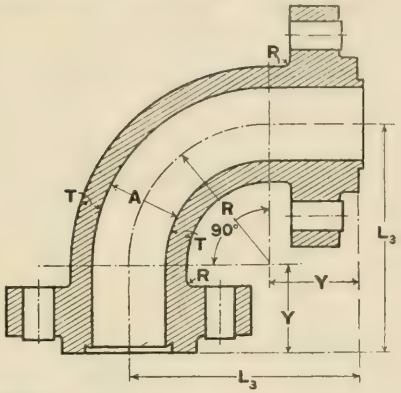


	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
A_1	**2**	**3**	**3**	**4**	**4**	**5**	**5**	**6**	**6**	**7**	**7**
A_2	**2**	**2**	**3**	**2**	**3**	**2**	**3**	**2**	**3**	**2**	**3**
B_1	8	8	9¾	8	9¾	8	9¾	8	9¾	8	9¾
E	4¼	4¼	6	4¼	6	4¼	6	4¼	6	4¼	6
F	6	6	8	6	8	6	8	6	8	6	8
H_1	1⅛	1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	1⅛	1⅜
H_2	9/16	9/16	11/16	9/16	11/16	9/16	11/16	9/16	11/16	9/16	11/16
L_1	23	27	27	34	34	38	38	42	42	48	48
L_2	13½	16½	16½	21	21	22½	22½	25	25	28½	28½
L_3	9½	10½	10½	13	13	15½	15½	17	17	19½	19½
L_4	5	5¾	6¼	6½	7	7¼	7¾	8	8½	8¾	9¼
N_1	1¾	1¾	2	1¾	2	1¾	2	1¾	2	1¾	2
P	2¼	2¼	2¾	2¼	2¾	2¼	2¾	2¼	2¾	2¼	2¾
Q	3¾	4	5	4	5	4	5	4	5	4	5
R_1	⅜	⅜	⅜	⅜	⅜	½	½	½	½	⅝	⅝
R_2	1⅛	1¼	1¼	1⅜	1½	1⅜	1½	1¾	1⅞	2	2⅛
R_3	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜
T_1	¾	1	1	1¼	1¼	1⅜	1⅜	1⅝	1⅝	1¾	1¾
T_2	1	1¼	1¼	1⅜	1⅜	1⅝	1⅝	2	2	2¼	2¼
T_3	1	1¼	1¼	1¼	1⅜	1¼	1½	1¼	1⅝	1¼	1⅝
T_4	1	1⅛	1¼	1⅛	1⅜	1⅛	1½	1⅛	1½	1⅛	1½
X	2¼	2¼	2¾	2¼	2¾	2¼	2¾	2¼	2¾	2¼	2¾
Weight in lbs.	81	154	167	278	292	423	438	639	655	947	963

Flanges of Body of Tee to be the same as for Straight Pipes of corresponding bore (see Table 1).

BRITISH STANDARD HYDRAULIC POWER BENDS.





45° BEND.

	CLASS A. For Working Pressures from 700 to 900 lbs. per sq. inch.							CLASS B. For Working Pressures from 900 to 1,200 lbs. per sq. inch.					
	Flange: Type 1.			Flange: Type 2.				Flange: Type 1.		Flange: Type 2.			
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
A	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**2**	**3**	**4**	**5**	**6**	**7**
R	12	14	16	18	20	23	23	13	16	16	18	18	18
R_1	⅜	⅜	⅜	½	½	⅝	¾	⅜	⅜	⅜	½	½	⅝
T	⅝	1 1/16	1 5/16	1⅛	1¼	1⅜	1⅝	¾	1	1¼	1⅜	1⅝	1¾
Y	3	3	4	5	6	7	8	3	3½	5	6	7	9
Weight in lbs.	30	56	107	191	281	507	711	46	100	189	296	435	648

90° BEND.

	CLASS A. For Working Pressures from 700 to 900 lbs. per sq. inch.							CLASS B. For Working Pressures from 900 to 1,200 lbs. per sq. inch.					
	Flange: Type 1.			Flange: Type 2.				Flange: Type 1.		Flange: Type 2.			
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
A	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**2**	**3**	**4**	**5**	**6**	**7**
L_3	9	10	11	13	15	18	20	9½	10½	13	15½	17	19½
R	6	7	7	8	9	11	12	6½	7	8	9½	10	10½
R_1	⅜	⅜	⅜	½	½	⅝	¾	⅜	⅜	⅜	½	½	⅝
T	⅝	1 1/16	1 5/16	1⅛	1¼	1⅜	1⅝	¾	1	1¼	1⅜	1⅝	1¾
Y	3	3	4	5	6	7	8	3	3½	5	6	7	9
Weight in lbs.	30	56	101	183	271	500	722	46	95	189	302	450	677

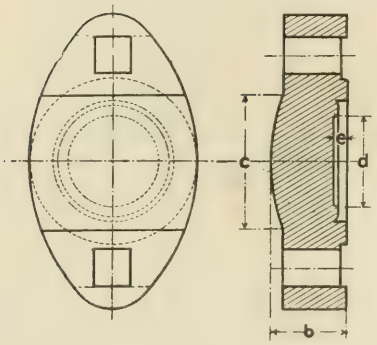
Flanges o Bends to be the same as for straight Pipes of corresponding bore.
The Bends to be "horizontal" or "vertical" as required.

BRITISH STANDARD BLANK FLANGES

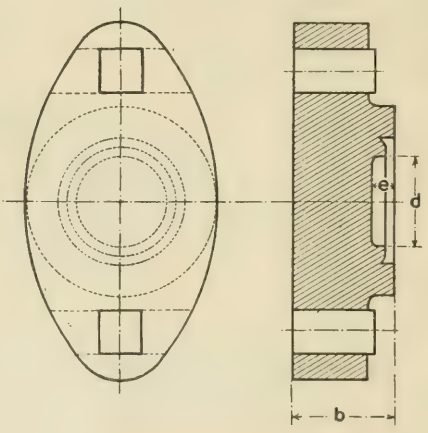
FOR

HYDRAULIC POWER PIPES.

FLANGE: TYPE 1.



FLANGE: TYPE 2.



Internal Diameter of Pipe.	CLASS A. For Working Pressures from 700 to 900 lbs. per sq. inch.							CLASS B. For Working Pressures from 900 to 1,200 lbs. per sq. inch.					
	Flange: Type 1.			Flange: Type 2.				Flange: Type 1.	Flange: Type 2.				
	ins. 2	ins. 3	ins. 4	ins. 5	ins. 6	ins. 7	ins. 8	ins. 2	ins. 3	ins. 4	ins. 5	ins. 6	ins. 7
b	2	2½	3	4	4¼	5	5¼	2⅜	3¼	4	4½	5	5½
c	3⅛	4	5¼	—	—	—	—	3¾	5¼	—	—	—	—
d	1¾	2¾	3½	4½	5½	6½	7½	1¾	2¾	3½	4½	5½	6½
e	⅜	⅜	½	⅞	⅞	⅞	⅞	⅜	½	⅞	⅞	⅞	⅞
Weight in lbs.	9	20	35	67	96	193	264	15	35	67	106	156	240

Flanges to be made either Spigot or Socket as specified.
Dimensions not shown in this table are to be in accordance with Table 1.

British Engineering Standards Association.

PRICE LIST
OF
BRITISH STANDARD SPECIFICATIONS AND REPORTS.
NOVEMBER, 1918.

(This List cancels all previous Lists.)

NOTE.—*Directly the necessary arrangements have been completed the Publications of the Association, with a few exceptions, will also be issued in French, Italian, Spanish and Portuguese. Both the English Editions and the Foreign Translations will be published in octavo form, and will be available at* 1/- *net per copy or its equivalent in Foreign moneys.*

Report No.		Net.	Post free.
1-1914	**Rolled Sections for Structural Purposes,** Lists of	1/-	1/2
2-1903	**Tramway Rails and Fish-plates,** Specification and Sections of	1/-	1/3
3-1903	**Influence of Gauge Length and Section of Test Bar on the Percentage of Elongation,** Report on, by Professor W. C. UNWIN, F.R.S.	1/-	1/2
4-1903	**Beams,** Properties of (included in No. 6)	Withdrawn.	
5-1905	**Locomotives for Indian Railways,** First Report on (Superseded by No. 50)	Withdrawn.	
6-1904	**Rolled Sections for Structural Purposes,** Properties of ...	1/-	1/3
7-1910	**Copper Conductors,** Tables of	1/-	1/3
8-1904	**Tramway Poles,** Specification for Tubular	1/-	1/2
9-1909	**Railway Rails,** Specification and Sections of Bull Head	1/-	1/3
10-1904	**Pipe Flanges,** Tables of ...	1/-	1/2
11-1909	**Railway Rails,** Specification and Sections of Flat Bottom ...	1/-	1.4
12-1915	**Portland Cement,** Specification for...	1/-	1 3
13-1910	**Steel for Shipbuilding,** Specification for Structural... ...	1/-	1/2
14-1907	**Steel for Marine Boilers,** Specification for Structural	1/-	1/2
15-1912	**Steel for Bridges,** etc., and General **Building Construction,** Specification for Structural	1/-	1/2
16-1905	**Telegraph Material,** Specification for...	1/-	1/5
17-1904	**Electrical Machinery.** Report on (Superseded by No. 72-1917)	Withdrawn.	
18-1910	**Tensile Test Pieces,** Forms of	Gratis	-/2
19-1905	**Temperature Experiments on Field Coils** of Electrical Machines, Report on	1/-	1/3
20-1913	**Screw Threads,** Report on	1/-	1 2
21-1909	**Pipe Threads** for Iron or Steel Pipes and Tubes, Report on ...	1/-	1/2
22-1905	**Insulating Materials,** Report on the **Effect of Temperature** on	Withdrawn.	
23-1905	**Trolley Groove and Wire,** Standards for	1/-	1/2
24-1911	**Railway Rolling Stock,** Specifications for **Material** used in the Construction of—		
	Part I. Locomotive, Carriage and Wagon Axles	1/-	1/2
	,, **II.** Locomotive, Carriage and Wagon Tyres	1/-	1/2
	,, **III.** Laminated, Volute and Helical Springs and Steel for Laminated Springs ...	1/-	1/2
	,, **IV.** Steel Forgings, Blooms and Castings	1/-	1/2
	,, **V.** Copper Plates, Rods and Tubes and Brass Tubes...	1/-	1/2
	,, **VI.** Steel Plates, Angles, etc., and Rivets for Locomotives, Carriages and Wagons	1/-	1/2
25-1906	**Errors in Workmanship,** Report on	Withdrawn.	
26-1907	**Locomotives for Indian Railways,** Second Report on (Superseded by No. 50)	Withdrawn.	
27-1906	**Limit Gauges for Running Fits,** Report on Standard Systems of	1/-	1/2
28-1908	**Nuts, Bolt Heads and Spanners,** Report on	1/-	1/2
29-1909	**Steel Forgings for Marine Purposes,** Specification for Ingot ...	1/-	1/2
30-1907	**Steel Castings for Marine Purposes,** Specification for ...	1/-	1/2
31-1910	**Steel Conduits for Electrical Wiring,** Specification for ...	1/-	1/2
32-1907	**Steel Bars** for use in **Automatic Machines,** Specification for	1/-	1/2

Report No.		Net.	Post free.
33-1906	**Carbon Filament Glow Lamps,** Specification for	1/-	1/2
34-1913	**Screw Threads,** Tables of British Standard Whitworth, British Standard Fine and British Standard Pipe Threads	Withdrawn.	
35-1907	**Copper Alloy Bars** for use in **Automatic Machines,** Specification for	1/-	1 3
36-1907	**Electrical Machinery,** Report on (Superseded by No. 72–1917)	Withdrawn.	
37-1915	**Electricity Meters,** Specification for	1/-	1/3
38-1913	**Limit Gauges for Screw Threads,** Report on Standard Systems for	Withdrawn.	
39-1908	**Screw Threads,** Combined Reports on	Withdrawn.	
40-1908	**Cast Iron Low Pressure Heating Pipes,** Specification for Spigot and Socket	1/-	1/2
41-1908	**Cast Iron Flue or Smoke Pipes,** Specification for Spigot and Socket	1/-	1/2
42-1909	**Steam Engines for Electrical Purposes,** Report on Reciprocating	1/-	1/2
43-1909	**Boiler Tubes,** Specification for Charcoal **Iron** Lap-welded ...	1/-	1/2
44-1909	**Cast Iron Pipes for Hydraulic Power,** Specification for ...	1/-	1/2
45-1917	**Sparking Plugs** (for Internal Combustion Engines), Report on Dimensions for	1/-	1/2
46-1909	**Keys and Keyways,** Specification for	1/-	1/2
47-1914	**Steel Fishplates** for Bull Head and Flat Bottom Railway Rails, Specification and Sections of ...	1/-	1/3
48-1909	**Wrought Iron** of Smithing Quality for Shipbuilding (Grade D), Specification for	1/-	1/2
49-1909	**Ammeters and Voltmeters,** Specification for	1/-	1/2
50-1910	**Locomotives for Indian Railways,** Third Report on (Superseding Nos. 5 and 26)	Under Revision.	
51-1913	**Wrought Iron** for use in Railway Rolling Stock ("Best-Yorkshire" and Grades A, B and C), Specification for	1/-	1/3
52-1910	**Lampholders and Caps,** Specification for Bayonet Socket ...	Under Revision.	
53-1913	**Boiler Tubes** for Locomotive Boilers, Specification for Cold Drawn Weldless **Steel**...	1/-	1/2
54-1911	**Screw Threads, Nuts and Bolt Heads** for use in **Automobile** Construction, Report on	1/-	1/2
55-1911	**Copper and Bronze Wire,** Report on Hard Drawn	1/-	1/3
56-1911	**Yield Point** and **Elastic Limit,** Definitions of	Gratis.	-/2
57-1911	**Small Screws,** Report on Heads for	1/-	1/2
58-1912	**Cast Iron Soil Pipes,** Specification for Spigot and Socket ...	1/-	1/3
59-1912	**Cast Iron Waste and Ventilating Pipes** (for other than Soil Purposes), Specification for Spigot and Socket	1/-	1/3
60-1913	**Tungsten Filament Glow Lamps** (Parts 1 and 2), Report on Experiments on	1/-	1/6
61-1913	**Copper Tubes** and their **Screw Threads** (primarily for domestic and similar work), Specification for	1/-	1/3
62-1913	**Marine Boiler Stays, Screwing** for	Gratis.	-/2
63-1913	**Broken Stone and Chippings,** Specification for Sizes of ...	1/-	1/2
64-1913	**Fishbolts and Nuts** for Railway Rails, Specification for ...	1/-	1/2
65-1914	**Salt-Glazed Ware Pipes,** Specification for...	1/-	1/2
66-1914	**Copper-Alloy Three-Piece Unions** (for Low and Medium Pressure Screwed Copper Tubes), Specification for	1/-	1/3
67-1914	**Ceiling Roses,** Specification for Two- and Three-Plate	1/-	1/2
68-1914	**Steel Conductor Rails,** Method of Specifying the **Resistance** of	1/-	1/2
69-1915	**Tungsten Filament Glow Lamps** (Vacuum Type) for **Automobiles,** Report on	1/-	1/2
70-1915	**Pneumatic Tyre Rims** for Automobiles, Motor Cycles and Cycles, Report on	1/-	1/3
71-1917	**Wheel Rims and Tyre Bands for Solid Rubber Tyres** for **Automobiles,** Report on Dimensions of	1/-	1/2
72-1917	**Electrical Machinery,** British Standardisation Rules for ...	1/-	1/2
73-1915	**Wall Plugs and Sockets,** Specification for...	1/-	1/2
74-1917	**Charging Plug and Socket,** for Vehicles Propelled by Electric Secondary Batteries, Specification for	1/-	1/2
75-1916	**Steels for Automobiles,** Specification for **Wrought**	1/-	1/2
76-1916	**Tars, Pitches, Bitumens** and **Asphalts** when used for Road Purposes, Report on **Nomenclature** of and Specifications for **Tar** and **Pitch** for Road Purposes	1/-	1/2
77-1916	**Electrical Pressures** for **New Systems** and **Installations** (Low and Medium Pressures) ...	Gratis	-/2
78-1917	**Cast Iron Pipes** and Special Castings for **Water, Gas** and **Sewage,** Specification for	1/-	1/3
80-1917	**Magnetos for Automobile Purposes,** Report on Dimensions of	1/-	1/2
83-April, 1918,	**Dope** and **Protective Covering** for **Aircraft,** Standard of Reference for	1/-	1/2
84-1918	**Screw Threads (British Standard Fine), B.S.F.,** and their **Tolerances,** Report on	1/-	1/2
85-April, 1918,	**Steel** for **Aircraft** for **Government Purchases** in the **United States of America,** Specifications for	Under Revision.	

INTERIM REPORTS.

C.L. 2582	**Ball Journal Bearings for Automobiles,** Interim Report on Sizes of Single Row...	Gratis	-/2
C.L. 3750	**French Metric Screw Threads for Aircraft** Purposes, Interim Report on	-/6	-/8

Printed by
Waterlow & Sons Limited, 49, Parliament Street,
Westminster, S.W. 1.